

CONSTRICTION OF THE DUODENUM BELOW THE ENTRANCE OF THE COMMON DUCT AND ITS RELATION TO DISEASE.¹

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SEVERAL years ago my attention was first directed to an interesting condition which is frequently present in patients which come under my observation during gall-bladder and stomach operations.

In many of these cases the duodenum is distended with gas to a point just below the entrance of the common duct,

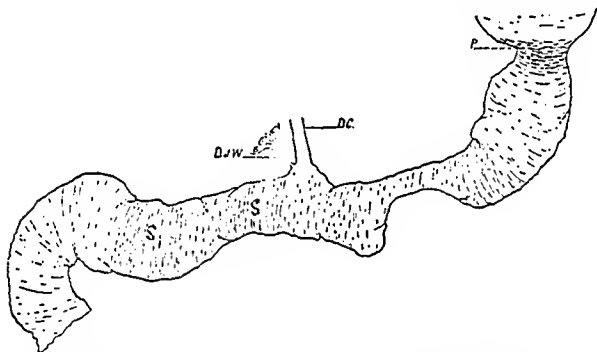


FIG. 1.—P, pylorus; D.C., common duct; D. of W., duct of Wirsung; S, a double sphincter.

while below this it is contracted, and upon raising the transverse colon and finding the origin of the jejunum, this portion of the intestine will also be found in a contracted condition.

In looking over authorities upon the subject of anatomy, I found that they all state that the third portion of the duodenum is the narrowest part of this intestine if they make any statement upon the subject. They also state that the first portion of the duodenum is usually found stained with bile after death.

¹ Read before the American Surgical Association, July, 1905.

Several further clinical observations pointed in the same direction.

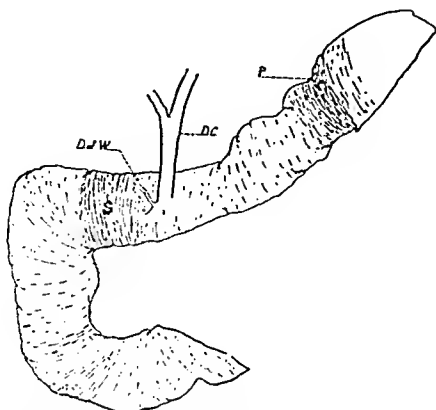


FIG. 2.—*P*, pylorus; *D.C.*, common duct; *D. of W.*, duct of Wirsung; *S*, sphincter below common duct.

It was found that the dilatation of the upper portion of the duodenum was most commonly present in patients suffering from chronic cholecystitis with sand or gall-stones in the

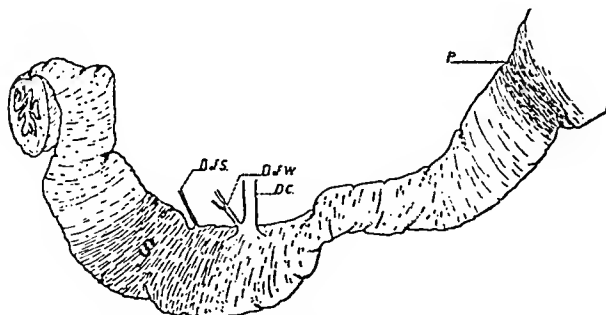


FIG. 3.—*P*, pylorus; *D.C.*, common duct; *D. of W.*, duct of Wirsung; *D. of S.*, duct of Santorini; *S*, sphincter below entrance of common duct.

gall-bladder. In these cases there was frequently a more or less marked enlargement of the pancreas.

In having the vomitus examined systematically for a con-

siderable period of time in patients who had been subjected to general anæsthesia for operation, it was found that the vomitus invariably contained bile, showing that there must be some reason why this fluid should be forced upward past the pyloric sphincter rather than downward through the small intestine.

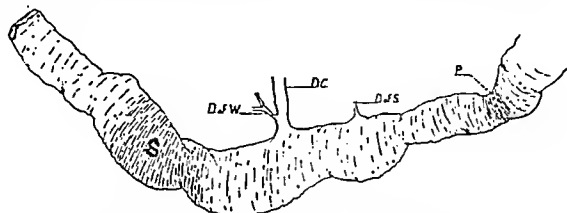


FIG. 4.—*P*, pylorus; *D.C.*, common duct; *D. of W.*, duct of Wirsung; *D. of S.*, duct of Santorini; *S*, sphincter below entrance of common duct.

Again, it was found that in patients suffering from acute gall-stone colic, the spasmodic pain would subside invariably within a few hours upon making careful gastric lavage and prohibiting the introduction of any kind of food into the stom-

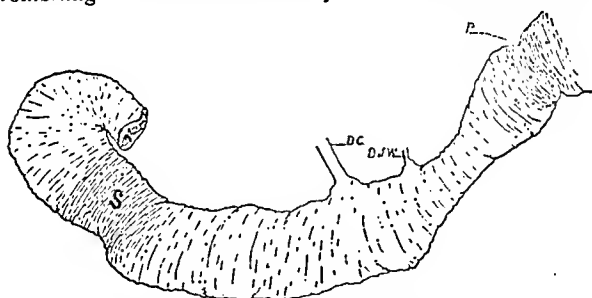


FIG. 5.—*P*, pylorus; *D.C.*, common duct; *D. of W.*, duct of Wirsung, $2\frac{1}{2}$ centimetres from *C.D.* towards *P*; *S*, point of greatest development of circular muscle fibres to centimetres below the entrance of the common duct.

ach, although without this aid large doses of morphine, given hypodermically, had given at best only temporary relief in these cases.

This seemed to indicate that there must be some point near the entrance of the common duct into the duodenum which regulates the passage of food through this intestine.

Since making these observations, the beautiful experiments of Dr. Cannon, and more recently those of Cannon and Blake (*ANNALS OF SURGERY*, May, 1905) have added another

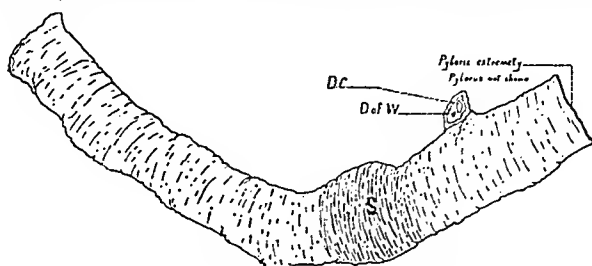


FIG. 6.—*D.C.*, common duct; *D. of W.*, duct of Wirsung; *S*, sphincter below entrance of common duct.

fact in the same direction by demonstrating that there is a distinct mixing process which takes place in the upper portion of the duodenum.

These clinical observations have induced me to make a

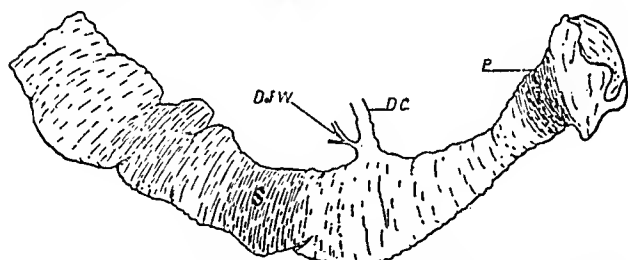


FIG. 7.—*P*, pylorus; *D.C.*, common duct; *D. of W.*, duct of Wirsung; *S*, point of greatest development of circular muscle fibres.

careful anatomical study of this portion of the small intestine, both in the living patient and in the cadaver.

My assistant, Mr. E. W. Thuerer, has dissected ten specimens, and has made accurate full-size tracings of the duodenum in each of these cases. He has further confirmed our observation by inspecting the duodenum in all cadavers dissected in the Medical Department of the University of Illinois during the past winter.

These specimens show a marked uniformity in several directions, as will be seen at once from the drawings.

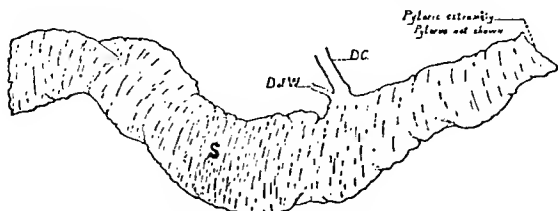


FIG. 8.—*D.C.*, common duct; *D. of W.*, duct of Wirsung; *S*, point of greatest development of circular muscle fibres.

In all of these specimens there is a greater or less degree of narrowing between the pylorus and the entrance of the common duct; this can also be seen perfectly in the speci-

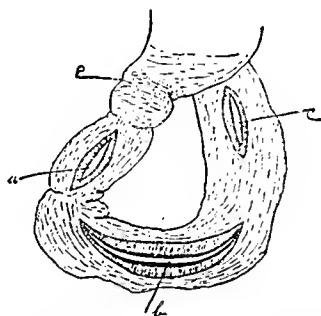


FIG. 9.—*P*, pylorus. The longitudinal incisions *a*, *b*, and *c* show the relative thickness of the circular muscle fibres, (*a*) between the pylorus and the point of entrance of the common duct, (*b*) at the point of greatest thickness 4 centimetres below the common duct, and (*c*) at the point of the duodenum 15 centimetres below this point.

mens at the present time, although their immersion in preserving fluid has, of course, brought about some changes.

In all of these specimens there is also a more or less marked thickening of the intestinal wall at a point 2 to 4 centimetres below the entrance of the common duct, and a careful study of this thickening demonstrates the presence of a marked increase in the circular muscle fibres, as is shown by

the accompanying microscopic sections taken from various portions of the intestinal wall as compared with this portion of the wall.

The arrangement of these circular muscle fibres would remind one very forcibly of the arrangement in the pylorus, although the fibres are much more diffuse, making a broad sphincter.

It seems as though all of these facts pointed towards the presence of a sphincter at this point whose physiological function would consist in providing for a means of retaining the

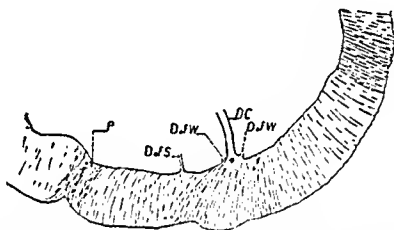


FIG. 10.—*P*, pylorus; *D. of S.*, duct of Santorini; *D. of W.*, duct of Wirsung, double in this case. The circular muscle fibres arranged obliquely, there being a sphincter-like arrangement directly opposite the entrance of the common duct.

chyme in the upper portion of the duodenum sufficiently long to provide for a thorough mixing with bile and pancreatic fluid, just as the pylorus serves the purpose of retaining the stomach contents, and the ileocaecal valve of retaining the contents of the small intestines.

We have long known that under certain pathological conditions the obstruction offered by the pylorus is increased far beyond the normal.

We also know that the passage of intestinal contents and gas is obstructed to a marked extent as the ileocaecal valve in case of inflammation in this vicinity, which is, of course, usually due to appendicitis; and it has seemed to me as though the above facts would indicate that under certain forms of irritation or inflammation of the gall-bladder or ducts, this duodenal sphincter had taken up a similar action, which would have to be considered physiological in character.

No.	Hosp. No.	Sex and Age.	Occupation and Nativity.	Past History and Family.	Condition.	Character.	Complications.	Examination.	Condition at Operation.
1	15342	F. 39	House-keeping, U. S.	Unimportant.	Gastro-enterostomy, cholecystostomy, gastric ulcer, cholecystitis.	Epigastric pain, vomiting; hæmatemesis six years.	Appendicitis 2 years ago; appendectomy 2 years ago; yellow fever 2 years ago; then recurrence of symptoms.	Epigastric tenderness; gastric ulcer, stomach not dilated.	Posterior surface near pylorus, gaping pylorus, duodenum distended; gall-bladder enlarged, sacculated, and contained dark, sandy bile; no stones.
2	15346	F. 40	Housewife, U. S.	Unimportant.	Gastric ulcer, chronic appendicitis, gastro-enterostomy, appendectomy.	Epigastric pain and gastric distress; seldom vomiting blood.	None.	Epigastric tenderness; stomach dilated; emaciated and anæmic.	Scar of old ulcer on anterior surface of pylorus; lymph glands enlarged, pylorus open; cementum; the appendix wall thickened; gall-bladder and pancreas normal.
3	15398	M. 49	Farmer, Sweden.	Liver trouble, cholecystitis.	Gastric ulcer, cholecystitis, gastro-enterostomy, cholecystostomy.	Right hypochondriac pain and constipation ten years; vomiting first three months; no blood; colicky pain in inguinal region.	Neurosis.	Tenderness beneath right costal margin and in right inguinal region.	Scar on posterior surface of pylorus, which is contracted and on jejunum; gall-bladder sacculated, distended with dark, sandy bile; appendix normal.
4	15635	F. 34	Housewife, Sweden.	Neurotic.	Ulcer duodenum, gastritis, gastric perineum, gastro-enterostomy.	Vomiting and headaches.	Neurosis with enteroptosis.	Thin, anæmic; no marked abdominal tenderness.	Stomach and duodenum dilated; lymphatics enlarged; appendix and gall-bladder normal.
5	14254	F. 29 U. S.	Unimportant.	Cholecystitis, pancreatitis, gastritis, appendicitis, cholecystostomy, appendectomy.	Gastric distress after eating; intermittent attacks of vomiting; no hæmatemesis.	None.	Epigastric tenderness; emaciation and anæmic; anorexia.	Duodenum as large as stomach as far as common duct, where it is adherent to enlarged pancreas and constricted; appendix cicatricial; duodenum adherent to liver.
6	14427	F. 24 Denmark.	Unimportant.	Gall-stones, chronic appendicitis, cholecystostomy, appendectomy.	Epigastric, right hypochondriac and right inguinal pains; nausea, vomiting, jaundice; no hæmatemesis.	None.	Tenderness beneath right costal arch; poorly nourished and anæmic.	Duodenum enlarged, ducts free; cystic duct dilated; gall-bladder contains stone, black, sandy bile, numerous stones, and shreds of tissues.

7	14580	F. 48	House- wife, Sweden.	Typhoid at 21 years.	Cholecystitis, gastric ulcer, cholecystostomy, appendectomy.	Appendicitis attack 6 years; for 2 years epi- gastric pains, radiat- ing to right side and back; vomiting.	None.	Tenderness over Mc- Burney's point be- neath the right costal margin and over the mid-epigastrium; fairly well nourished, but anemic.	Stomach and duodenum down to point opposite papilla di- lated; omentum adherent to thickened gall-bladder, which contained dark bile.
8	14603	F. 53	House- wife, U. S.	Recurrent attack of gastritis. One sister died ulcer- ated stomach.	Gallstones, gastric ulcer, pancreatitis, appendectomy, cholecystostomy.	Epigastric pain after eating lasts an hour; never vomits.	None.	Tenderness marked over Kolson point; poorly nourished and anemic.	Stomach and duodenum down to point opposite papilla di- lated; pancreas enlarged; com- mon and cystic ducts contain stones; chronic appendicitis.
9	14638	F. 51	House- wife, Sweden.	Typhoid at 18 years, 2 brothers died of gas- tric trouble; cancer.	Cholecystitis, pancreatitis, cholecystostomy.	Hypochondriac pain; seldom vomiting; ten- derness.	Epilepsy.	Tenderness in both up- per abdominal quad- rants.	Duodenum dilated down to papilla; pancreas enlarged and hard; gall-bladder en- larged, walls thickened, con- tains tarry bile.
10	14666	F. 31	House- wife, U. S.	Recurrent attack of stomach trouble. Unimpor- tant.	Cholecystitis, appendicitis, cholecystostomy.	Recurring attacks of epigastric pain, gas- tric distress, vomiting and jaundice.	None.	Well nourished; ten- derness beneath the right costal margin.	Duodenum dilated; gall-bladder contained tarry bile; appendix dilated.
11	14728	F. 68	House- wife, German.	?	Cholecystitis, pancreatitis, appendicitis, cholecystostomy.	Hypochondriac pain; vomiting.	None.	Emaciated, anemic; epigastric tenderness.	Duodenum greatly distended; gall-bladder contained black sandy bile.
12	14787	F. 58	House- wife, Sweden.	Chlorosis at 10 years.	Cholecystitis, pancreatitis, cholecystostomy.	Constipation about 2 years.	None.	Emaciated; anemic.	Duodenum dilated, pancreas enlarged; gall-bladder con- tained tarry bile.
13	15443	M. 39	Machin- ist, German.	Typhoid in boyhood. ?	Gallstones, cholecystostomy, pancreatitis, appendectomy.	Recurrent attacks of epigastric pain with vomiting; jaundice at times.	None.	Tenderness above McBurney's point and just above the umbil- icus.	Duodenum dilated, pancreas enlarged; cholelithiasis, chole- cystitis, chronic appendicitis.
14	15689	F. 48	House- wife, Sweden.	Unimpor- tant. Unimpor- tant.	Gallstones, pancreatitis, cholecystostomy.	Recurrent attacks of epigastric pain and vomiting; no jaun- dice.	None.	Epigastric and hypo- chondriac tenderness; well nourished.	Stomach and duodenum di- lated; pylorus normal; gall- stones, cholecystitis, pancrea- titis, dark, sandy bile.